
M2000 telephones (retired)

This chapter provides feature, software requirement, and specification information for the M2009, M2112, M2018, and M2018S (secure) telephones. Note that the M2317 and the M2000 Modular telephones are described in earlier chapters.

Functional description

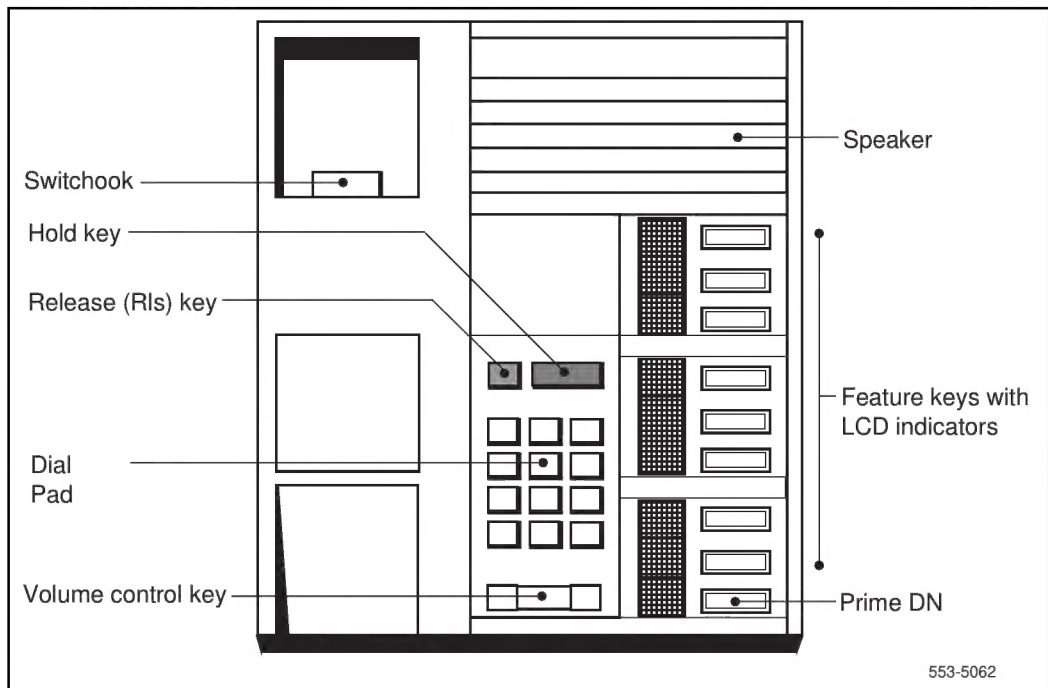
The M2009, M2112, M2018, and M2018S telephones (see [Figures 24, 25, and 26](#)) are designed to provide cost-effective integrated voice and data communications capability. These telephones communicate with the Meridian 1, using digital transmission over standard twisted pair wiring; they interface with the Meridian 1 system through the Integrated Services Digital Line Card (ISDL) or the Digital Line Card (DLC). No additional hardware is required at the line circuit to provide data communications, and so there is a significant cost savings potential. Analog/digital and digital/analog conversion of voice signals is accomplished at the telephone by a codec.

The M2009, M2112, M2018, and M2018S telephones are connected to the system through a two-wire loop carrying two independent 64 kbps PCM channels with associated signaling channels. One of the two PCM channels is dedicated to voice, while the other is dedicated to data traffic. Line cords and handset cords on all Meridian digital telephones are equipped with modular connectors for quick and easy connecting procedures.

The telephone interfaces with the DLC or the ISDL in the Peripheral Equipment shelf of the Meridian 1 system. The ISDL supports eight Integrated Voice and Data ports; each port supports two channels, one data and one voice. A voice TN and a data TN are assigned in Meridian 1 system software.

M2009—a multi-line telephone with nine programmable function keys. It is loop powered, but the Asynchronous Data Option (ADO), when equipped, requires an external power supply.

Figure 24
M2009 telephone

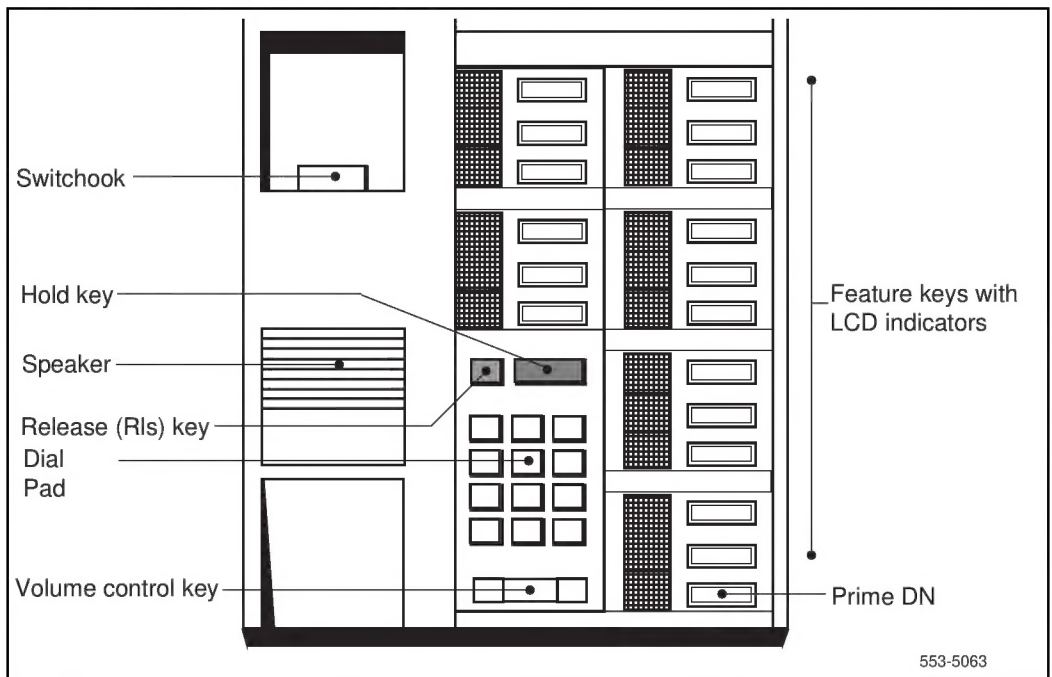


M2018—a multi-line telephone with 18 programmable function keys. It is loop powered, but the ADO, when equipped, requires an external power supply.

M2018S—a multi-line telephone, similar to the M2018, but with the following security feature: The handset is equipped with mercury micro-switches that provide a positive disconnect when the handset is positioned horizontally. A disconnect relay circuit electrically connects the piezo-disc transducer for alerting and on-hook dialing when the telephone is activated and disconnects the piezo-disc transducer when the telephone is idle. This feature eliminates any microphonic capability of the piezo-disc transducer when it is idle.

Note: Wall mounting the M2018S defeats the proper operation of the mercury switched handset and is prohibited.

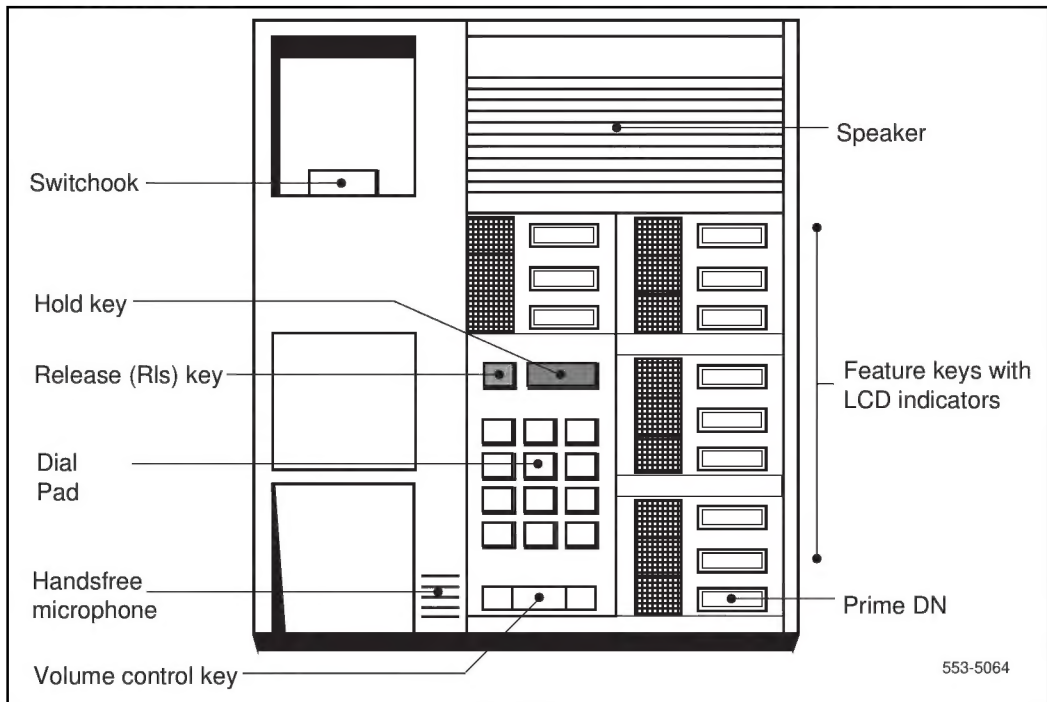
Figure 25
M2018 and M2018S secure telephone



M2112—a high-performance multi-line telephone with 11 programmable function keys and integrated Handsfree unit. A loudspeaker and microphone are provided for alerting tones and for Handsfree operation. The M2112 requires auxiliary power to enable the Handsfree feature (either a QUT125 VAC closet power supply or an A0273077 plug-in transformer). When equipped with the ADO, the multi-output power supply (A0336823) replaces the A0273077 or QUT1 transformer (only one transformer is required at any time). See [Figure 26](#).

For information on powering requirements, see the specifications section.

Figure 26
M2112 telephone



Physical characteristics

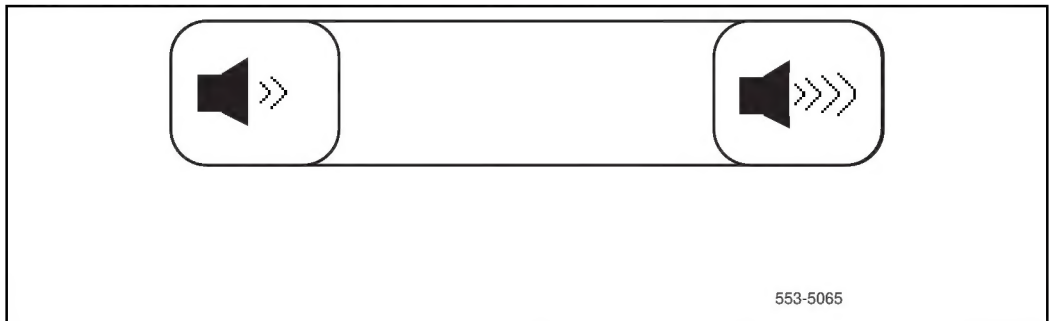
The M2009, M2112, and M2018 telephones and the M2018S secure telephone have the following physical characteristics.

Fixed keys

The fixed keys perform the following functions: Volume control, Hold, Release, and Handsfree (M2112 only).

Volume control key Speaker volume (or piezo-disc transducer volume in digital telephones not equipped with a Handsfree unit) is controlled by one key with two toggle positions as shown in [Figure 27](#). Operating the “Volume Up” or “Volume Down” pad of the key incrementally increases or decreases the volume for the tone or sound that is currently active. Note that to change the volume of the ringing sound, the user must depress “Volume Up” or “Volume Down” during the interval when a burst of ringing is heard. The volume settings are retained for subsequent calls until new volume adjustments are made.

Figure 27
Volume control key



Note: When any M2000 telephone is disconnected, both the speaker volume and alerting tone levels return to default values (midpoint levels) after the telephone is reconnected.

Handsfree key (M2112 only) With the Handsfree on, you can talk to another party without lifting the handset. Handsfree can be activated by pressing the Handsfree/Mute key or by pressing a DN key without lifting the handset. The Handsfree/Mute LCD indicator shows the status of the Handsfree. Once Handsfree is activated, it can be deactivated by picking up the handset or by pressing the Release (RLS) key.

Handsfree operates as if an off-hook operation had been performed. For example, when the telephone is idle, pressing the Handsfree/Mute key turns on the integrated Handsfree and selects a DN (depending on line selection as assigned through COS), allowing the user to make a call. When a call comes in to an M2112 and the telephone is ringing, pressing the Handsfree/Mute key turns on the Handsfree and allows the user to answer the incoming (ringing) call (depending on COS-assigned line selection) without picking up the handset.

When the Handsfree/Mute key is depressed during a Handsfree telephone conversation, the microphone is turned off while the loudspeaker remains on, preventing the far end from overhearing local conversations. The Handsfree/Mute LCD flashes while the Handsfree feature is in the “Mute” mode. Pressing the Handsfree/Mute key again restores microphone operation and the Handsfree/Mute indicator will quit flashing and return to its original state (steadily on).

Asynchronous Data Option

When an M2000 telephone is equipped with the Asynchronous Data Option (ADO), you can make a data call using keyboard dialing from your attached terminal or personal computer, without interfering with voice communication.

See “Data options” on page 99 of this document for more information on the data options for the M2009, M2112, M2018, and M2018S telephones.

Specifications

This section lists the specifications required for M2000 telephones.

Environmental and safety considerations

Both the telephone and the Asynchronous Data Option (ADO) meet the requirements of the Electronic Industries Association (EIA) specification PN-1361.

Temperature and humidity

Operating state:

Temperature range	0° to 50°C (32° to 104°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity is limited to 52 mbar of water vapor pressure.

Storage:

Temperature range	–50° to 70°C (–58° to 158°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity is limited to 52 mbar of water vapor pressure.

Electromagnetic interference

The radiated and conducted electromagnetic interference meets the requirements of Subpart J of Part 15 of the FCC rules for class A computing devices.

Line engineering

M2000 telephones operate through twisted pair wiring on transmission lines selected by the rules given in *Digital telephone line engineering* (553-2201-180). The maximum permissible loop length is 3500 ft. of 24 AWG (0.5 mm) standard twisted wire with no bridge taps.

Local alerting tones

Four alerting tones and a buzz sound are provided. The Meridian 1 controls the cadence of the ringing by sending tone-ON and tone-OFF messages to the telephone. The alerting tone cadences cannot be changed from the telephone but can be altered for individual M2000 telephones by software controlled adjustments in the system. Refer to *X11 input/output guide* (553-3001-400) for more information. All other telephone tones such as dial tone or overflow tones are provided by the system from a Tone and Digit Switch.

Alerting tone characteristics

The tone frequency combinations are as follows:

Tone	Frequencies	Warble rate(Hz)
1	(667 Hz, 500 Hz)	10.4
2	(667 Hz, 500 Hz)	2.6
3	(333 Hz, 250 Hz)	10.4
4	(333 Hz, 250 Hz)	2.6

Note: A 500 Hz buzz signal is provided for incoming call notification while the receiver is off-hook.

Power requirements

Both the M2009 telephone and the M2018 telephone are loop powered. Loop power uses +15 V and –15 V sources and assumes 3500 feet maximum loop length of 24 AWG (0.5 mm) wire and a minimum of 13.5 V at the telephone terminals.

The Handsfree unit, which is integrated in the Meridian M2112, requires an auxiliary power supply. Power can be obtained from either a QUT1 25 VAC closet power supply or a local plug-in transformer (AO273077) over a separate pair of wires.

If the power supply fails, Handsfree will not operate, but all other features will continue to function, provided the power failure does not affect the Meridian 1. The loop-powered functions of all Meridian digital telephones remain operational only if the system is equipped with a backup battery.

Additional power is obtained over a separate pair of wires. Maximum Handsfree current is 110 mA with a minimum of 16 VAC to be present at the telephone terminal. The following rules apply:

- For the QUT1 closet power supply:
 - The power supply loop for the Handsfree unit should follow the same rules as the loop powering requirements, that is, the maximum allowable loop length and wire gauge are 3500 ft. of 24 AWG (0.5 mm) wire.
 - Each M2112 Handsfree must be powered by one tap of one winding; however, it is permissible to connect two (2) 12.5 VAC windings in a series to provide 25 VAC power for Handsfree.
- For the local plug-in transformer:
 - A single winding transformer equipped with a 3 m (10 ft.) cord of 22 AWG two-conductor stranded and twisted wire with a modular duplex adapter (NE-267QA) at the end is required.
 - The following minimum specifications have to be met by this transformer:
 - No load output voltage: 21 V ac max
 - Voltage at rated current: 16 V ac $\pm 10\%$
 - Rated load current: 375 mA

If the ADO is installed, an external power supply is required in addition to the power from the line. See “Data options” on page 99 for a description of the ADO and its requirements.

Ordering information

This section provides ordering information for M2000 telephones. Refer to the Northern Telecom price book or contact your Northern Telecom representative for specific ordering codes.

The M2000 telephones have few field replaceable parts. The handset, handset cord and line cord, equipped with modular connectors, headset, power transformer (external power supply), key lenses and labels, and the ADO circuit board can be changed. If an M2000 fails to function properly, or if mechanical breakage occurs, do not attempt to make repairs in the field. Return the unit to the manufacturer.

